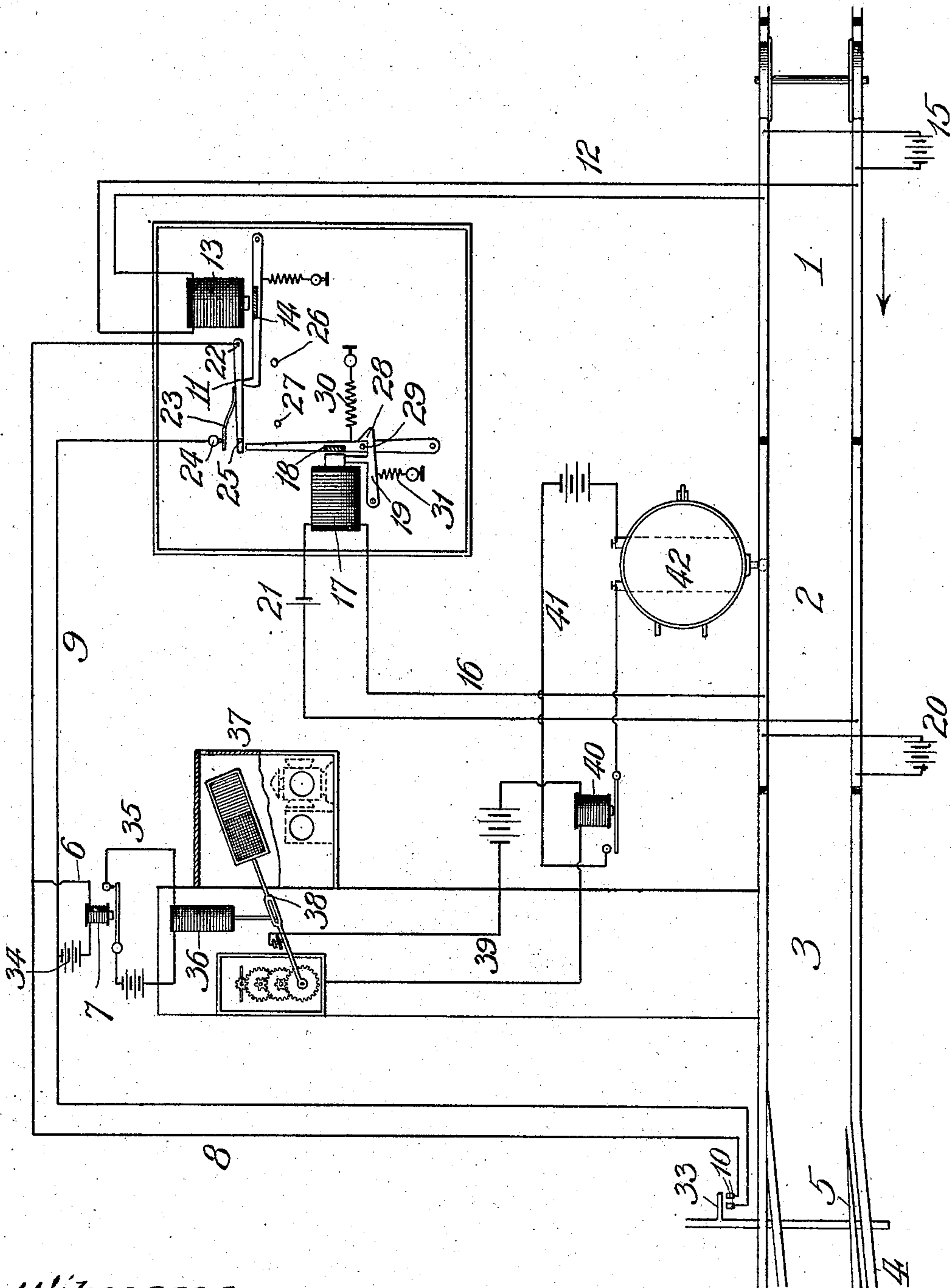


No. 858,591.

PATENTED JULY 2, 1907.

E. E. FLORA.
CIRCUIT CONTROLLING MEANS.
APPLICATION FILED OCT. 11, 1906.



Witnesses:
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UNITED STATES PATENT OFFICE.

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CIRCUIT-CONTROLLING MEANS.

No. 858,591.

Specification of Letters Patent.

Patented July 2, 1907.

Application filed October 11, 1906. Serial No. 338,378.

To all whom it may concern:

Be it known that I, ELLSWORTH E. FLORA, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Circuit-Controlling Means, of which the following is a specification.

My invention relates particularly to means for controlling an electric circuit for any desired purpose, as, for instance, the operation of a signal through the medium of said circuit.

My primary object is to provide means whereby a circuit-changer, such, for instance, as an ordinary make-and-break device, may be controlled by two magnets, each in its own circuit, and one having one armature controlling the circuit-changer, and the other having an armature controlling said circuit-changer and having also a second armature controlling its first-named armature.

The invention is illustrated in the accompanying drawing, showing diagrammatically one method of employing the invention in connection with visual and detonating railway-signals.

The invention is generically claimed herein, and, in its associations with certain other devices, is claimed in the application of Ellsworth E. Flora and Robert J. Zorge No. 338,411, of even date herewith.

Generally speaking, the invention involves the control of an electric circuit by two circuits, one of which loses its controlling power when a short circuit is established therein and the other of which loses its controlling power only upon rupture thereof.

It may be preliminarily stated that in the accompanying diagram visual and alarm signals are represented as controlled by the circuit whose condition is controlled by my improved circuit-controlling means. Said visual signal and alarm signals form no portion of the present invention, however, but illustrate briefly one use to which my present invention has been put in the apparatus described and claimed in the joint application mentioned.

In the drawing, 1, 2, 3 represent insulated track-sections of a railway, the section 3 connected with a side-track 4 controlled by a switch-point 5; 6, a signal-controlling circuit having included therein a magnet 7, the circuit 6 having branches 8 and 9, the former having contacts 10 adapted to be closed when the switch 5 is closed, and the latter having a circuit-changer 11; 12, a circuit provided with a magnet 13 having an armature 14 controlling said circuit-changer, said circuit connected with and established through both track-rails of the section 1 and having a battery 15 whose terminals connect with the rails; 16, a circuit connected with and established through both track-rails of the section and equipped with a magnet 17 having one armature 18 controlling the circuit-changer 11 and having also a second

armature 19 of bell-crank form controlling the armature 18; 20, a battery in the circuit 16 having its terminals connected directly with the rails; and 21, a second battery in the circuit 16, one of whose terminals connects directly with the magnet 17.

The circuit-changer 11 is mounted on a pivot 22 and equipped near its free end with a yielding contact-member 23 which normally engages a stationary contact 24. The circuit-changer, which is included in the branch-circuit 9 is equipped near its end with a laterally projecting stud 25, through the medium of which the armature 18 supports the circuit-changer when the batteries 15 and 20 are short-circuited and the armature 19 maintains the armature 18 in a partially open condition. Stops 26 and 27 are provided for the armatures 14 and 18, respectively. In addition, a hook, or stop, 28, for the armature 18 is carried by the armature 19, said hook being adapted to engage a lateral stud 29 with which the armature 18 is provided, thereby to hold the armature 18 in position to prevent the circuit-changer from opening under certain conditions. Springs 30 and 31 are connected with the armatures 18 and 19, the springs being so tensioned that a stronger pull from the magnet 17 is required to hold the armature 18 than is required to hold the armature 19, whereby, upon short-circuiting of the battery 20 the armature 18 will fall back one step and then be held by the armature 19, unless a rupture of the circuit 16 occurs, in which case the armature 19 will be released and the armature 18 will be permitted to fall back against the stop 27 and clear the stud 25, thus permitting the circuit-changer 11 to open, assuming the battery 15 to be short-circuited.

The branch-circuit 8 is shown provided with contact-members 10 adapted to be connected by a contact-member 33 when the switch 5 is closed. The circuit 6 is supplied with a battery 34 which normally energizes the magnet 7. The magnet 7 is employed to control signals, or it may be employed for any desired purpose.

The signals form no part of the present invention and the only purpose in describing them briefly will be to give an understanding of one useful application of my invention.

The magnet 7 controls a circuit 35 having a magnet 36 controlling a visual signal 37. The semaphore arm 38 of said visual signal is included in and adapted to make and break a circuit 39 equipped with a magnet 40. The magnet 40 controls a circuit 41, which, in turn, controls the operation of torpedo-placing mechanism 42, as shown, for instance, in the joint application mentioned above.

The operation will now be readily understood. Assuming the branch-circuit 8 to be open, the circuit-changer 11 will be dropped to break the branch-circuit 9 in the event of the short-circuiting of the battery 15 alone, as by a train approaching the block 2 through the

block 1 in the direction indicated by the arrow. On the other hand, short-circuiting of the battery 20 alone, as by a train approaching the block 1 through the block 2, will cause the armature 18 to be dropped one step, or
 5 until held by the hook 28 on the armature 19. In this position, the armature 18 will lock the circuit-changer (shown in the present case as a circuit-maker and breaker) against dropping; so that upon short-circuiting
 10 of the battery 15, as by the train passing partially into the block 1, the circuit-changer nevertheless will not be dropped to break the branch-circuit 9, it being observed that the spring 23 serves to preserve the circuit, even though the member 11 drops slightly before it is supported upon the armature 18. It thus appears that
 15 the instrument comprising the magnets 13 and 17 and their armatures will serve to prevent operation of the signals while a train is moving in the direction opposite that indicated by the arrow, until after the train has cleared the block 2. Thus, where torpedo-placing
 20 mechanism is employed for signaling purposes, operation of the same at a time not desired is obviated. It is to be observed, however, in the event of a failure of the circuit 16, the armature 18 would be permitted to fall back against its stop 27, so that the circuit 9 will be
 25 broken the instant the train encounters the block 1, in which case an alarm will indicate the defect in the circuit.

The essential characteristic of the instrument comprising the magnets 13 and 17 and their attendant parts
 30 is that the circuit-changer shall be controlled by two armatures, one of which, in turn, is controlled by a third armature. It is not essential that the circuit-changer be distinct from the armature 14, but it may form a part thereof, in which case the armatures 14 and
 35 18 would become interlocking armatures.

What I regard as new, and desire to secure by Letters Patent, is—

1. The combination with a controlling circuit, of a circuit-changer for said circuit, a magnet having an armature controlling said circuit-changer, and a second magnet
 40 having an armature controlling said circuit-changer and having also an armature controlling said second-named armature.

2. The combination with a controlling circuit-equipped with a circuit-changer, of a circuit equipped with a magnet having an armature controlling said circuit-changer, and another circuit having two batteries located at different points therein and equipped with an electro-magnet
 45 having an armature controlling said circuit-changer and having also an armature controlling said second-named
 50 armature.

3. The combination with a controlling circuit, of a circuit-changer therefor, a yielding contact-member, a magnet having an armature controlling said circuit-changer, and a magnet having an armature controlling said circuit-changer and having also an armature controlling said
 55 second-named armature.

4. The combination with a circuit, of a movable circuit-changer therefor, a magnet equipped with an armature movable independently of and controlling said circuit-changer, and a magnet equipped with one armature having interlocking relation with said circuit-changer and equipped with another armature having interlocking relation with said second-named armature.
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5. The combination with a circuit, of a circuit-changer
 65 therefor, an armature controlling said circuit-changer, a second armature controlling said circuit-changer, a third armature controlling said second-named armature, a circuit having an electro-magnet controlling said first-named armature, and a circuit having electro-magnetic means
 70 controlling said second and third named armatures, said last-named circuit having two batteries located at different points and said second-named armature requiring a stronger force to hold it than the third-named armature.

ELLSWORTH E. FLORA.

In presence of—

C. W. WASHBURN,
 J. H. LANDES.